MAR 7 1990

FLOOD INSURANCE STUDY

VILLAGE OF REMINDERVILLE
OHIO
SUMMIT COUNTY

MAY 17, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - 390855

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

VILLAGE OF REMINDERVILLE,
SUMMIT COUNTY,
OHIO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Reminderville, Summit County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE), Buffalo District (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-87-E-2509, Project Order No. 29. This study was completed in July 1988.

1.3 Coordination

On May 7, 1987, an initial meeting was held with representatives of FEMA, the Ohio Department of Natural Resources (ODNR), the Village of Reminderville, and the Study Contractor to determine the streams to be studied in detail. Also, a news article announcing the intent to perform a Flood Insurance Study for the Village of Reminderville was published in The Bulletin, Twinsburg, Ohio. The announcement encouraged those with any relevant facts or technical data concerning local flood hazards to forward them to the Study Contractor or the Village of Reminderville. Letters were sent to the U.S. Soil Conservation Service (SCS), the Summit County Engineer, the ODNR, and the Village of Reminderville requesting technical data that would be useful in conducting this Flood Insurance Study.

On June 7, 1989, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Reminderville, Summit County, Ohio. The area of study is shown on the Vicinity Map (Figure 1).

Flooding caused by overflow of Aurora Pond, Channel Brook, Pond Brook, Tributary D, and Tributary A was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for the Village of Reminderville (Reference 1) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through May 1992. The scope and methods of study were proposed to and agreed upon by FEMA and the Village of Reminderville.

2.2 Community Description

The Village of Reminderville is in northeastern Summit County in northeastern Ohio, about 15 miles southeast of the City of Cleveland. It is bordered on the north by the City of Solon, on the east by the the City of Aurora, and on the south and west by the unincorporated areas of Summit County. The 1980 population of the village was reported to be 1,960 (Reference 2).

The topography of most of northeastern Ohio is hilly; however, the topography of the study area is relatively flat, with wetland areas to the west and south and slightly higher land to the east. Much of the low-lying land north of Aurora Pond is highly developed as a residential area. The land surrounding the study area on the east, north, and west is hilly, rising about 40 feet above the level of Aurora Pond and draining into the study area, thus increasing the flood hazard.

The climate of Summit County is characteristically midcontinental, moderated by the close proximity of the county to Lake Erie. Temperatures recorded at the Akron-Canton climatological data station ranged from an extreme high temperature of 100 degrees Fahrenheit (^{o}F) to an extreme low of -21^{o}F. Average yearly precipitation is 35.13 inches, with a recorded maximum of 4.18 inches in a 24-hour period (Reference 3).

2.3 Principal Flood Problems

The history of flooding in northeastern Ohio indicates that flooding may occur during any season of the year. The majority of the major floods occur during winter and spring and are usually the result of spring rains and/or snowmelt. Summer cyclonic storms, moving out of the southwest, have also produced high-intensity rainfall over the study area and caused

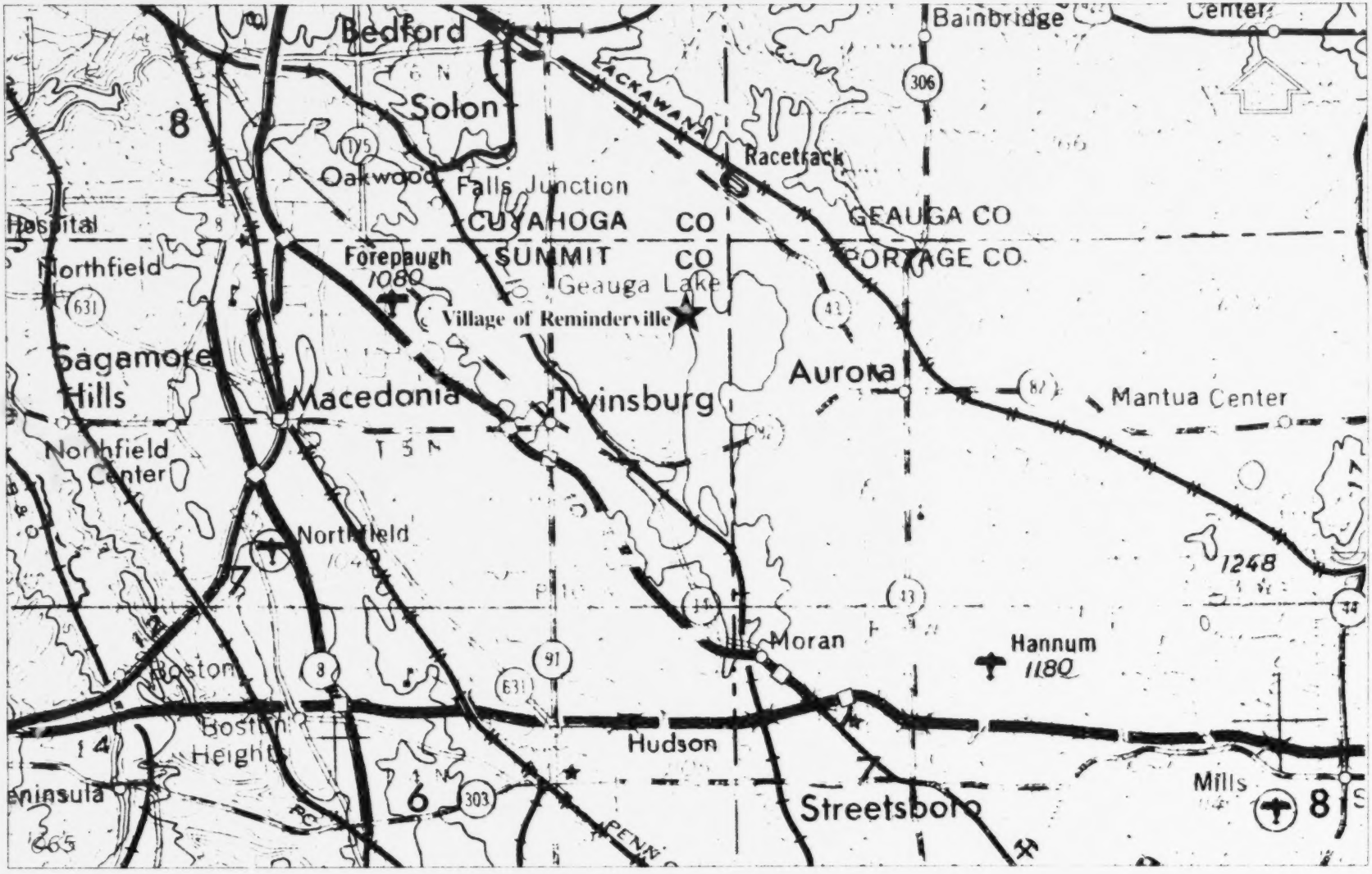


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF REMINDERVILLE, OH
(SUMMIT CO.)

APPROXIMATE SCALE

2 0 2 4 6 MILES

VICINITY MAP

widespread flooding. However, past flood events are not well documented within the Village of Reminderville.

2.4 Flood Protection Measures

The level of Aurora Pond is controlled by a gated control structure. Past practice has been to lower the elevation of Aurora Pond by about 3 feet during the winter by opening the gate; however, this does not provide flood protection during other times of the year and does not protect the Village of Reminderville from extreme events such as the 100-year flood. No other flood protection structures are known to exist within the study area.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

No gaging stations exist in the immediate study area. Discharges for Pond Brook, Channel Brook, Tributary A, and Tributary D were calculated using TR-20, a runoff hydrograph model (Reference 4).

Along Pond Brook, a decrease in peak discharge occurs just upstream of the confluence of Tributary C due to storage characteristics of the stream.

Aurora Pond has three outlet structures that control the water level. Two of the structures are uncontrolled overflow weirs. The third is a gated control structure. A combined outlet rating curve for the three outlets was established using weir, orifice, inlet control, and outlet control equations. For this analysis, it was assumed that the gate is closed and that the level of the pond is controlled by the overflow weirs. This is the normal

situation during the summer, as the gated control structure is only used to lower the level of Aurora Pond during fall and winter.

Peak discharge-drainage area relationships for the 100-year flood of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
POND BROOK		
at mouth of Tributary A	4.4	490
just upstream of confluence of Tributary C	2.9	320
at mouth of Tributary D	1.0	100
TRIBUTARY D		
at confluence of Pond Brook	1.5	340
TRIBUTARY A		
at confluence of Pond Brook	6.3	80
CHANNEL BROOK		
just upstream of Aurora Pond	2.4	215
just upstream of Glenwood Road	1.9	160

Elevations for floods of the selected recurrence intervals of Aurora Pond are shown in Table 2.

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	PEAK ELEVATION (FEET NGVD) 100-YEAR
AURORA POND	
along shoreline	1,002.1

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the backwater analysis were obtained from field surveys and topographic maps (Reference 5). All bridges and culverts were surveyed to obtain elevation data and structural geometry. Four culverts beneath Channel Brook that contain flooding along Pond Brook were also field surveyed.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observation of the streams and floodplain areas. The channel and overbank "n" values for the studied streams range from 0.012 to 0.05 and 0.04 to 0.07, respectively.

Water-surface elevations for the 100-year flood were computed using the HEC-2 step-backwater computer program (Reference 6). The starting water-surface elevation for Pond Brook was determined using the normal depth method. The starting water-surface elevations for Tributary A and Tributary D were the computed 100-year flood elevation of Pond Brook at the confluence of each tributary. The starting water-surface elevation for Channel Brook was the computed 100-year flood elevation of Aurora Pond.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 10 feet (Reference 5).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for the Village of Reminderville (Reference 1).

4.2 Floodways

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights.

Floodways have not been shown or computed for this community. Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The Flood Insurance Studies published for the City of Solon and Summit County, Ohio (References 7 and 8) are in agreement with this study.

A Flood Insurance Study in progress for the City of Aurora, Ohio (Reference 9) is in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the Village of Reminderville, Ohio (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 175 West Jackson Boulevard, 4th Floor, Chicago, Illinois 60604-2698.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Village of Reminderville, Summit County, Ohio, May 1979.

2. U.S. Department of Commerce, Bureau of Census, 1980 Census of Population, Number of Inhabitants, Ohio, Washington, D.C., February 1982.

3. ————, National Oceanic and Atmospheric Administration, Environmental Data Services, Climatology Data for Ohio, Asherville, North Carolina, 1976-1978.

4. U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, Technical Release No 20, Computer Program for Project Formulation, Hydrology, May 1982.

5. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 Feet: Twinsburg, Ohio, 1963, photorevised 1984.

6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, April 1984.

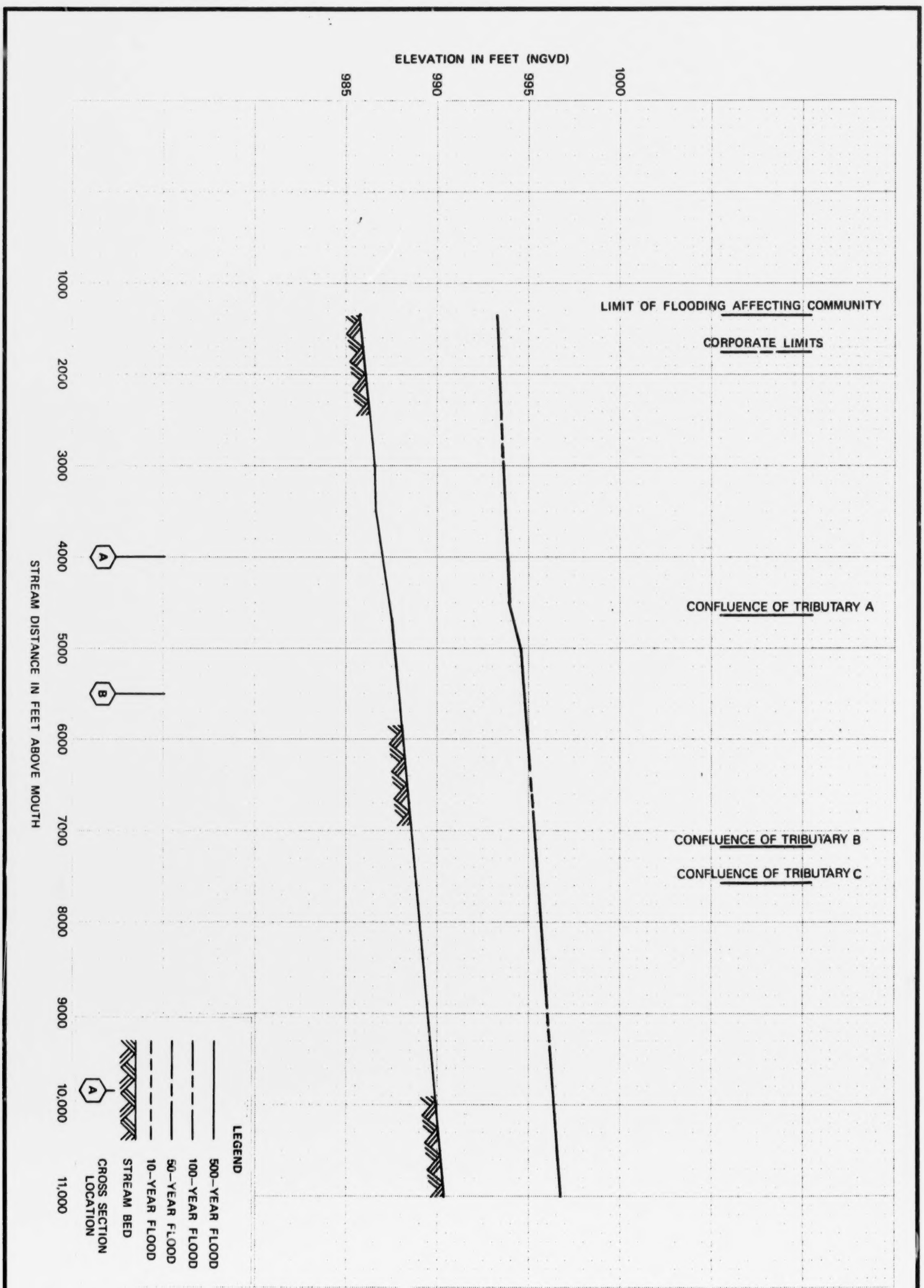
7. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Solon, Cuyahoga County, Ohio, February 1981.

8. ————, Federal Insurance Administration, Flood Insurance Study, Summit County, Unincorporated Areas, Ohio, October 1980.

9. ————, Flood Insurance Study, City of Aurora, Portage County, Ohio, in progress.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0005	1,002.21	top of fire hydrant located on Nautilus Trail just west of county boundary, about 1,200 feet northeast of intersection of Skipper Cove and Nautilus Trail
2	0005	1,008.18	chiseled cross on upstream west abutment headwall of Nautilus Trail bridge over Channel Brook
3	0005	1,006.19	top of bolt at northwest end of middle corrugated metal culvert for Channel Brook under Glenwood Road
4	0005	998.46	chiseled square on top of downstream headwall of triple culvert for Tributary D under Tradewinds Trail



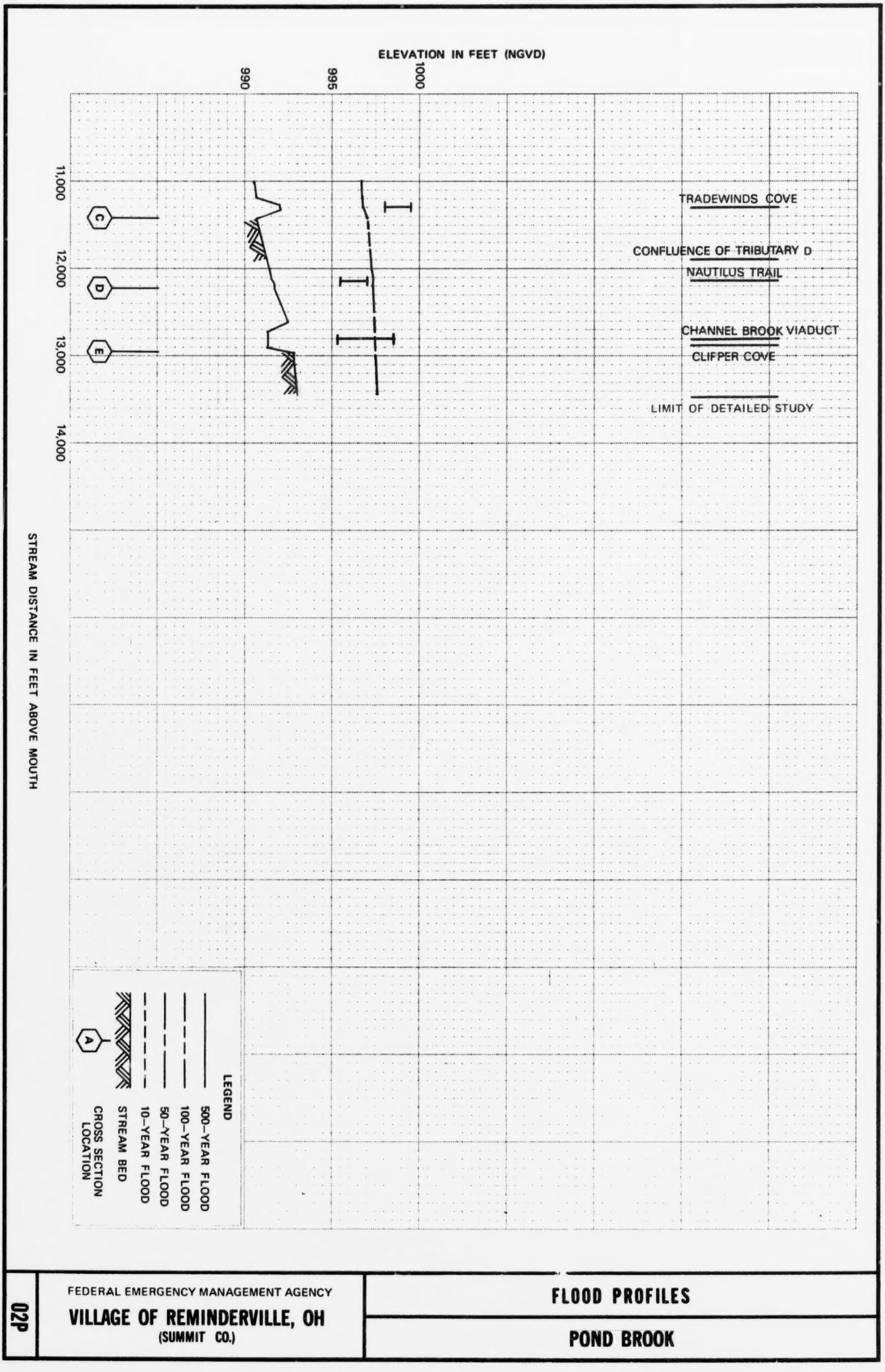
01P

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF REMINDERVILLE, OH
(SUMMIT CO.)

FLOOD PROFILES

POND BROOK



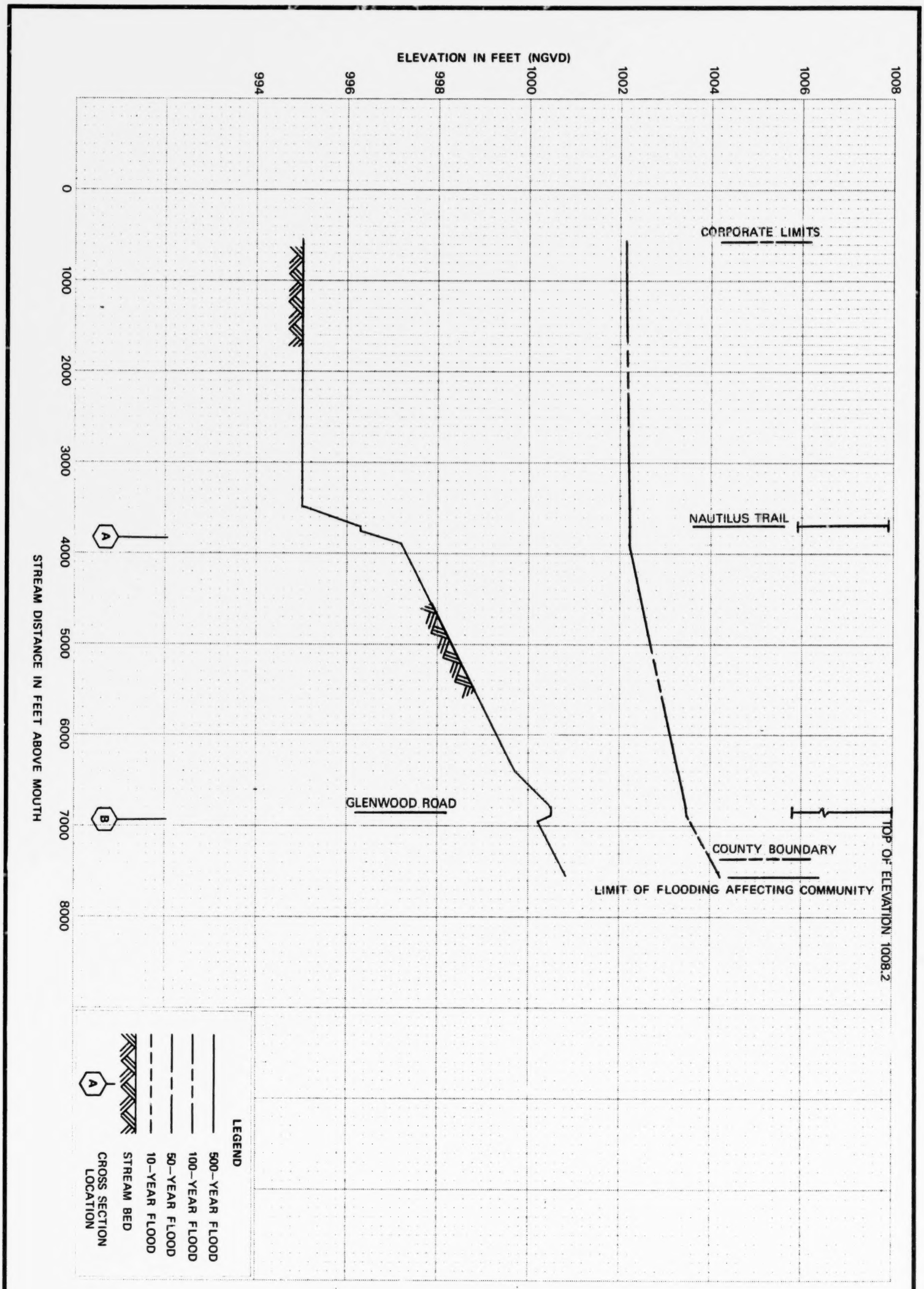
02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF REMINDERVILLE, OH
(SUMMIT CO.)

FLOOD PROFILES

POND BROOK



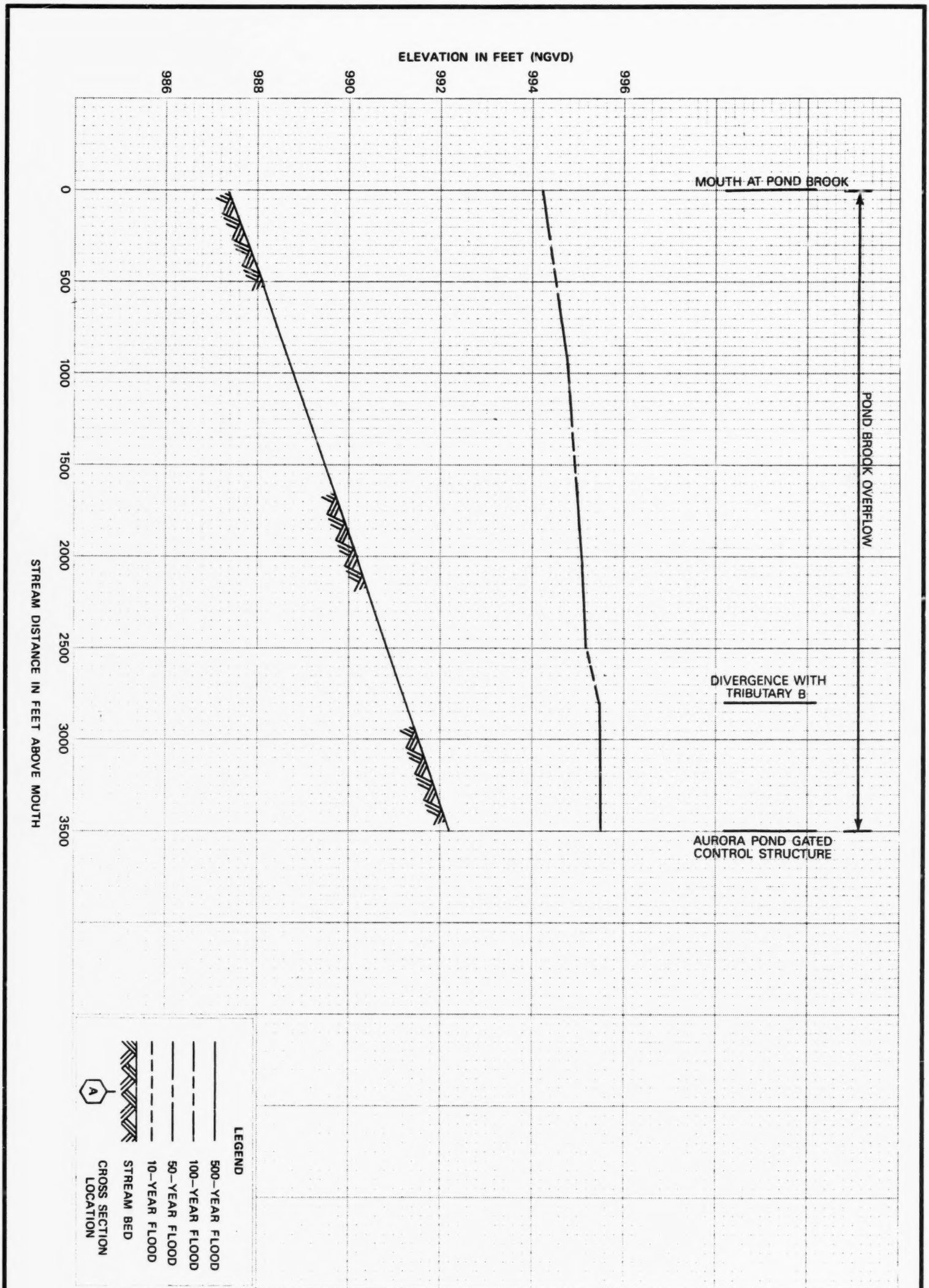
03P

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF REMINDERVILLE, OH
(SUMMIT CO.)

FLOOD PROFILES

CHANNEL BROOK



04P

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF REMINDERVILLE, OH
(SUMMIT CO.)

FLOOD PROFILES

TRIBUTARY A

FLOOD PROFILES

TRIBUTARY D

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VILLAGE OF REMINDERVILLE, OH

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05P